

*Amendments to the Specification*

Please replace the fourth paragraph on page 6, lines 9-10, with the following amended paragraph:

In a further aspect of this [[embodiment]] embodiment R<sub>1</sub> and R<sub>2</sub> are saturated or unsaturated C<sub>10</sub>-C<sub>18</sub> alkyl groups.

Please replace the fourth paragraph on page 9, lines 18-19, with the following amended paragraph:

In other compounds, [[R5]] R<sub>5</sub> is selected from the group consisting of monosaccharides, disaccharides, and polysaccharides.

Please replace the last paragraph on page 21, lines 32-35, with the following amended paragraph:

wherein if n is 1, and m is 2 to 6, and R<sub>1</sub> and R<sub>2</sub> separately or together are C<sub>1</sub>-C<sub>23</sub> alkyl or C(O)-C<sub>1</sub>-C<sub>23</sub>, and [[R3 and R4]] R<sub>3</sub> and R<sub>4</sub> separately or together are H or unbranched alkyl C<sub>1</sub>-C<sub>6</sub>, and R<sub>5</sub> is NH-R<sub>6</sub>-R<sub>7</sub> then R<sub>6</sub>-R<sub>7</sub> is not -(CH<sub>2</sub>)<sub>z</sub>NH<sub>2</sub> where z is 2-6; or -(CH<sub>2</sub>)<sub>3</sub>-NH-(CH<sub>2</sub>)<sub>4</sub>NH<sub>2</sub>; or -NH-(CH<sub>2</sub>)<sub>3</sub>-NH-(CH<sub>2</sub>)<sub>4</sub>-NH(CH<sub>2</sub>)<sub>3</sub>NH<sub>2</sub>, C(O)-fluorescein, or

Please replace the third paragraph on page 32, line 46, with the following amended paragraph:

In a preferred embodiment of this structure,  $n=1-2$ . In another preferred embodiment,  $m=2-4$ . In a further preferred embodiment,  $k=0-4$ . Preferentially,  $[[R3-10]] \underline{R_{3-10}}$ , if alkyl, are  $[[C10-15]] \underline{C_{10-15}}$ .

Please replace the fifth paragraph on page 32, lines 27-35, with the following amended paragraph:

wherein  $[[R1, R2, R3 \text{ and } R4]] \underline{R_1, R_2, R_3, \text{ and } R_4}$  are independently linear or branched, unsubstituted or substituted  $C_{1-23}$  alkyl, acyl, alkylene or heteroalkyl groups having from 0 to 6 sites of unsaturation, cyclic and aryl groups, and containing from 0 to 5 heteroatoms wherein said heteroatoms are not the first atoms in said groups, the substituent groups selected from  $-O-(CH_2)_k-CH_3$ ,  $-S-(CH_2)_k-CH_3$ ,  $X-(CH_2)_k-$ , wherein X is a halide, and  $-N-((CH_2)_k-CH_3)_2$ , wherein the alkyl groups contain from 0 to 2 heteroatoms;  $n$  is 1 to 6;  $m$  is 2 to 10; and  $[[R5]] \underline{R_5}$  is a chemical structure having functional groups that define a species of formula 2.  $[[R5]] \underline{R_5}$  is preferably linked to the ammonium nitrogen through an alkyl linker, which can also contain heteroatoms.

Please replace the last paragraph on page 34, lines 32-35 (and continuing with the first 3 lines on page 35), with the following amended paragraph:

$[[R1 \text{ and } R2]] \underline{R_1 \text{ and } R_2}$  are independently H, linear or branched, unsubstituted or substituted  $C_{1-23}$  alkyl, acyl, alkylene or heteroalkyl groups having from 0 to 6 sites of

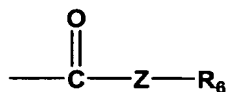
unsaturation, cyclic and aryl groups, said groups comprising from 0 to 5 heteroatoms wherein said heteroatoms are not the first atoms in said group, wherein the substituent groups are selected from  $-O-(CH_2)_k-CH_3$ ,  $-S-(CH_2)_k-CH_3$ ,  $X-(CH_2)_k-$ , wherein X is a halide, and  $-N-((CH_2)_k-CH_3)_2$ , wherein the alkyl groups comprise from 0 to 2 heteroatoms and k is 0 to 4.

Please replace the first full paragraph on page 35, lines 4-10, with the following amended paragraph:

[[R3 and R4]] R<sub>3</sub> and R<sub>4</sub> are independently H, linear or branched, unsubstituted or substituted C<sub>1-23</sub> alkyl, alkylene or heteroalkyl groups having from 0 to 6 sites of unsaturation, cyclic and aryl groups, said groups comprising from 0 to 5 heteroatoms wherein said heteroatoms are not the first atoms in said group, wherein the substituent groups are selected from  $-O-(CH_2)_k-CH_3$ ,  $-S-(CH_2)_k-CH_3$ ,  $X-(CH_2)_k-$ , wherein X is a halide, and  $-N-((CH_2)_k-CH_3)_2$ , wherein the alkyl groups of said substituents comprise from 0 to 2 heteroatoms and k is 0-4;

Please delete the second full paragraph on page 35, lines 13-29, with the following amended paragraph:

[[R5]] R<sub>5</sub> has the structure



wherein Z is selected from the group consisting of I, S, NR<sub>1</sub>, NH, Se, and  
[[CR7R8]] CR<sub>7</sub>R<sub>8</sub>;

[[R6]] R<sub>6</sub> is selected from the group consisting of absent, H, [[R1, R2, R3 and  
R4]] R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub>;

n is 1 to 6;

m is 1 to 10;

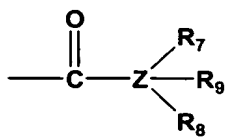
Y is a pharmaceutically acceptable anion; and

[[R7 and R8]] R<sub>7</sub> and R<sub>8</sub> independently or in combination are H or alkyl  
groups as defined for [[R1 and R2]] R<sub>1</sub> and R<sub>2</sub>;

wherein if Z is O, n is 1, and m is 3, then [[R6]] R<sub>6</sub> is selected from the group  
defined for [[R3 and R4]] R<sub>3</sub> and R<sub>4</sub> and wherein R<sub>1</sub> and R<sub>2</sub> are not both H.

Please replace the first paragraph on page 36, lines 15-26, with the following  
amended paragraph:

and when Z is C, [[R5]] R<sub>5</sub> has the structure



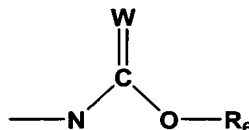
wherein  $[[R_7, R_8 \text{ and } R_9]]$   $R_7, R_8, \text{ and } R_9$  are independently H or are selected from the group defined for  $[[R_1, R_2, R_3 \text{ and } R_4]]$   $R_1, R_2, R_3 \text{ and } R_4$ .

Please replace the second paragraph on page 36, lines 27-29, with the following amended paragraph:

In all members of this species  $[[R_6, R_7, R_8 \text{ and } R_9]]$   $R_6, R_7, R_8 \text{ and } R_9$  optionally further comprises a chemically linked amino acid, peptide, polypeptide, protein, nucleic acid, nucleotide, polynucleotide, mono-, di- or polysaccharide, or other bioactive or pharmaceutical agent.

Please replace the first full paragraph on page 38, lines 5-24, with the following amended paragraph:

The carbonyl cationic lipids of the invention also include those having the isomeric carbamyl structure wherein  $[[R_5]]$   $R_5$  has the structure



wherein W is as defined above,  $[[R_6]]$   $R_6$  is as defined for the carboxy species and  $[[R_7]]$   $R_7$  is absent, or is H or an alkyl group as defined for the carboxy species. Preferred embodiments of the carbamate cytofectins comprise methyl carbamate groups attached to the lipid through alkyl linkers  $(\text{CH}_2)_m$  wherein m is 2 to 4.

Please replace the second full paragraph on page 38, lines 25-30, with the following amended paragraph:

In other preferred embodiments  $[[R1 \text{ and } R2]]$  R<sub>1</sub> and R<sub>2</sub> are saturated or unsaturated C<sub>10</sub>-C<sub>18</sub> alkyl groups. In still further preferred embodiments,  $[[R1 \text{ and } R2]]$  R<sub>1</sub> and R<sub>2</sub> are identical and are selected from the group consisting of C<sub>14</sub>H<sub>29</sub> and C<sub>12</sub>H<sub>25</sub>. In other preferred embodiments,  $[[R3 \text{ and } R4]]$  R<sub>3</sub> and R<sub>4</sub> are selected from the group consisting of C<sub>1</sub>-C<sub>5</sub> alkyl groups and C<sub>1</sub> to C<sub>5</sub> heteroalkyl groups having one heteroatom therein. In other preferred embodiments  $[[R3 \text{ and } R4]]$  R<sub>3</sub> and R<sub>4</sub> are methyl.

Please replace the last paragraph on page 39, line 32, with the following amended paragraph:

wherein  $[[R5]]$  R<sub>5</sub> has the structure

Please replace the paragraph at page 40, lines 25-28, with the following amended paragraph:

One species of the cationic lipids of the invention of this class thus has the general structure of formula 1 and is characterized by the presence of a ureyl group in the substituent on the ammonium nitrogen of formula 1. In this species  $[[R5]]$  R<sub>5</sub> has the structure as defined above wherein W is oxygen.

Please replace the last paragraph at page 40, lines 30-33, with the following amended paragraph:

Another species of cationic lipids of the invention according to this class are characterized by the presence of a guanidyl group in a substituent of the ammonium group nitrogen of formula 1 and have the general structure of formula 1 wherein  $[[R5]]$   $R_5$  has the structure as defined above wherein W is N or NH.

Please replace the first paragraph at page 41, lines 1-3, with the following amended paragraph:

The cationic lipids of the invention also include compounds having the general structure of formula 1 wherein  $[[R5]]$   $R_5$  has the structure as defined above wherein W is S or Se.

Please replace the second paragraph at page 41, lines 5-8, with the following amended paragraph:

The cationic lipids of the invention also include compounds having the general structure of formula 1 wherein  $[[R5]]$   $R_5$  is as defined above wherein W is C, CH,  $[[CHR1]]$   $CHR_1$ , or  $[[CR1R2]]$ ,  $CR_1R_2$  wherein  $[[R1 \text{ and } R2]]$ ,  $R_1$  and  $R_2$  are as defined for formula 1;  $[[R6, R7 \text{ and } R8]]$   $R_6$ ,  $R_7$ , and  $R_8$  are selected from the group defined for  $[[R1, R2, R3 \text{ and } R4]]$   $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$ .

Please replace the paragraph at page 45, lines 17-20, with the following amended paragraph:

wherein if Z is NH and n is 1 and m is 2 to 6, and  $[[R1 \text{ and } R2]]$ , R<sub>1</sub> and R<sub>2</sub> separately or together are C<sub>1</sub>-C<sub>23</sub> alkyl or C(O)-C<sub>1</sub>-C<sub>23</sub>, and  $[[R3 \text{ and } R4]]$ , R<sub>3</sub> and R<sub>4</sub> separately or together are H or unbranched alkyl C<sub>1</sub>-C<sub>6</sub>, then  $[[R5]]$ , R<sub>5</sub> is not  $[-(CH_2)_zNH_2]$   $-(CH_2)_zNH_2$  where z is 2-6; or  $-(CH_2)_3-NH-(CH_2)_4-NH_2$ ; or  $-NH-(CH_2)_3-NH-(CH_2)_4-NH(CH_2)_3-NH_2$ , C(O)-fluorescein, or

Please replace the paragraph at page 47, lines 15-20, with the following amended paragraph:

Preferably, R<sub>1</sub> and R<sub>2</sub> are saturated or unsaturated C<sub>10</sub>-C<sub>18</sub> alkyl groups. In another embodiment R<sub>1</sub> and R<sub>2</sub> are identical and are selected from the group consisting of C<sub>14</sub>H<sub>29</sub> and C<sub>12</sub>H<sub>25</sub>. In a further embodiment, R<sub>3</sub> and R<sub>4</sub> are selected from the group consisting of C<sub>1</sub>-C<sub>5</sub> alkyl groups and C<sub>1</sub>-C<sub>5</sub> heteroalkyl groups having one heteroatom therein. In yet another embodiment, R<sub>3</sub> and R<sub>4</sub> are methyl groups. In an additional embodiment,  $[[X1 \text{ and } X2]]$ , X<sub>1</sub> and X<sub>2</sub> are NR<sub>4</sub>R<sub>5</sub> and R<sub>4</sub> and R<sub>5</sub> are H. In another embodiment, n and m are 2-5.

Please replace the paragraph at page 62, lines 22-25, with the following amended paragraph:



The cationic lipids used were the DLRIE series (n=2-6) and the DOAP series wherein the alkyl chain has either 10, 12 or 14 carbon atoms. The DOAP series corresponds to formula 2 in which  $[[R1=R2=\text{unbranched}]]$   $R_1=R_2=\text{unbranched}$  alkyl chain, n=1,  $[[R3=R4=CH_3]]$   $R_3=R_4=CH_3$ , m=3, G=N and  $[[R5-H]]$   $R_5=H$ .